bio-protocol Preprint

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Optogenetic stimulation

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An abbreviated version of this protocol was published in Science Advances in Sep 2020

Hypothalamic circuitry underlying stress-induced insomnia and peripheral immunosuppression

DOI: 10.1126/sciadv.abc2590

Detailed protocol

1. Transfer the mice to double stacked cages with open top allowing access to EEG/EMG recording cable, and glass fiber patch cord after recovery following viral injection, glass fiber (200-µm core diameter, Doric Lenses, Franquet, Québec, Canada) implantation, and EEG/EMG electrode implantation

2. Connect a 3-meter long optogenetic stimulation patch cord (200-µm core diameter, Doric Lenses, Franquet, Québec, Canada) to a 473-nm blue light generator (Laserglow)

3. Align the output site of light generator with the patch cord connector to optimize the light output

4. Calibrate the light intensity with a Thorlabs light meter to 10-mW at the other side of the glass fiber patch cord, which will be connected to the glass fiber implant in the mouse brain

5. Connect the Laserglow light generator to a Master 8 stimulator (A.M.P.I.) with a BNC cable

6. Set the parameters on Master 8 to control the light pulse output pattern with a 15-ms pulse width at 0.1 Hz for 6 hours

7. Press trigger to confirm the stimulation pattern is correct

8. Connect the mice equipped with EEG/EMG electrodes to EEG/EMG recording cables

9. Check EEG/EMG signal quality with VitalRecorder (Kissei Comtec Co.)

10. Connect the glass fiber patch cord to the glass fiber implant with a Zirconia connector (Doric Lenses, Franquet, Québec, Canada)

11. Allow the mice to habituate to the connected EEG/EMG cable and glass patch cord for one week

12. Start EEG/EMG recording and press trigger on Master 8 at the beginning of light phase for 473-nm light pulse optogenetic stimulation at 0.1 Hz for 6 hours

How to cite:（Readers should cite both the Bio-protocol preprint and the original research article where this protocol was used）

1. Li, S. (2020). Optogenetic stimulation. Bio-protocol Preprint. bio-protocol.org/prep612.
2. Li, S., Borniger, J. C., Yamaguchi, H., Hédou, J., Gaudilliere, B. and Lecea, L. D.(2020). Hypothalamic circuitry underlying stress-induced insomnia and peripheral immunosuppression. Science Advances 6(37). DOI: 10.1126/sciadv.abc2590

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